3. Input B-109 - Pigtails, per Strand

4. Input B-110 - Optical Distribution Panel

5. Input B-111 - E, F & I, per Hour

6. Input B-115 - Channel Bank Investment, per 24 Lines

7. Input B-117 - Digital Cross Connect System, Installed, per DS-3

8. Input B-118 - Transmission Terminal Fill (D-0 Level)

9. Input B-119 - Installed Cost per Foot of Interoffice Fiber Cable

10. Input B-122 - Transport Placement

    - The cost of placement of fiber cable structures.

11. Input B-124 - Interoffice Conduit, Cost and Number of Tubes

    - The cost per foot of interoffice cable conduit and the number of spare tubes placed per route.

(2) MCI'S AND AT&T'S STATED BASIS FOR THEIR DEFAULT VALUES

MCI and AT&T claim the following basis for deriving the default values:

1. For the investment in the Add-Drop Multiplexers (ADMs) that extract/insert signals into OC-48 fiber rings (B-107), the estimates for the input were based upon industry experience and the expertise of HAI Consulting, supplemented by consultations with telecommunications equipment suppliers. No backup workpapers or data was provided to support this input.

2. The assumed fiber cross section, or number of fibers in a cable, in the interoffice fiber ring and point for point network (B-108), is stated to be 24. The default value is based upon the engineering judgement of HAI Model developers. No backup workpapers or data was provided to support this input.

3. The cost of the short fiber connectors that attach the interoffice ring fibers to the wire center

transmission equipment via a patch panel (B-109) is estimated to be $60 per pigtail. The source of this figure is a 1992 publication entitled Residential Fiber Optic Networks and Engineering and Economic Analysis, and the engineering judgement of HAI R5.0a developers.

4. The cost of the physical fiber patch panel used to connect 24 fibers to the transmission equipment (B-110) was based upon an estimate by a team of experienced outside plant experts who are alleged to have contracted for hundreds of such installations. No backup workpapers or data was provided to support this input.

5. The per hour cost for the "engineered, furnished, and installed" activities for equipment in each wire center (B-100) associated with the interoffice fiber ring was estimated by a team of experienced outside plant experts. No backup workpapers or data was provided to support this input.

6. Investment in voice grade to DS-1 multiplexers in wire centers (B-115) required for some special access circuits was based upon industry experience and the expertise of HAI Consulting, supplemented by consultations with telecommunications equipment suppliers. No backup workpapers or data was provided to support this input.

7. The investment required for a digital cross connect system that interfaces DS-1 signals between switches and OC-3 multiplexers (B-117), expressed on a per DS-3 basis, is based upon the estimate made by HAI Consulting, supplemented by consultations with telecommunications equipment suppliers.

8. The fraction of maximum DS-0 circuit capacity that can actually be utilized in ADMs and DS-1 to OC-3 multiplexers (B-118) is based upon judgement made by outside plant subject matter experts.

9. MCI and AT&T did not state the specific steps they took to ensure that the default values for each of the UAIs for this Sensitive Input Group reflected the conditions of the territory of BST or any other company, and did not state the results of the steps they undertook to make that assurance. Thus, there is no demonstration that the default values they have chosen (which presumably MCI and AT&T believe are forward-looking) are reflective of the conditions in BellSouth's territory.

10. MCI and AT&T did not state the basis upon which their experts developed their estimates for the default values used in applying HAI R5.0a, and did not provide workpapers and sources associated therewith, where the basis for the default values was claimed to be "expert opinion."

(3)
ALTERNATIVE VALUES BASED UPON COST AND OTHER DATA SPECIFIC TO BELLSOUTH

The following BellSouth-specific values were obtained for the user-adjustable inputs that make up Sensitive Input Group 10:

1. For transmission terminal investment (B-107), specific information was obtained for the following components:

   - For OC-48 ADMs, with 48 DS-3 capacity, material cost information was available on two systems:

     - FT 2000, having a material cost of $114,087.
     - FLM 2400, with a material cost of $98,749.

     These amounts include hardwired components, common plug-ins and deferrable plug-ins.

     In implementing this equipment, we have recommended a cost that melds the implementation of FT-2000 and FLM-2400 systems. The particular meld, which varies by state, reflects a 70% probability of occurrence of the less expensive system, unless BellSouth data indicates it actually installs the less expensive system at a greater frequency, in which case the BellSouth probability of occurrence is used.

     Appropriate in-plant factors for each state are applied to derive installed costs.

   - For OC-48 ADMs, with 12 DS-3 capacity, there are two systems:

     - FT 2000, with a material cost of $65,623.
     - FLM 2400, with a material cost of $61,522.

     The recommended implementation [meld] of the above two systems is similar to that used for OC-48 ADMs with 48 DS-3 capacity. The material costs included costs of hardwired equipment, common plug-ins and deferrable plug-ins.

     Appropriate in-plant factors for each state are applied to derive installed costs.

- For the OC-3/DS-1 terminal multiplexer, information is available on two BST-specific systems:

  - •• DDM 2000, with a material cost of $28,724.
  - •• FLM 150, with a material cost of $27,963.

  These material costs included costs of hardwired equipment, common plug-ins and deferrable plug-ins. The recommended implementation [meld] of the above two systems is similar to that used for OC-48 ADMs with 48 DS-3 capacity.

  Appropriate in-plant factors for each state are applied to derive installed costs.

- The "investment per 7 DS-1" input is stated to represent the amount by which the investment in OC-3s is reduced for each unit of 7 DS-1s below full capacity of the OC-3. Cards capable of handling four DS-1s are available for the systems described above:

  - •• DDM 2000, for a material cost of $**.
  - •• FLM 150, for a material cost of $**.

  These costs are then multiplied by 7 and divided by 4 [7/4] to produce an input, as required by HAI R5.0a, for 7 DS-1s. In addition, appropriate in-plant factors for each state are applied to derive installed costs.

** Amounts are confidential, pursuant to vendor agreements.

2. The fiber cross section, or number of fibers in a cable (B-108), in the interoffice ring varies on the type of structure. It is current BST practice to have a cross section of 36 fibers for aerial cable, 30 fibers for buried cable and 30 fibers for underground cable. However, to be conservative, we have accepted the default value of 24 fibers in a cable for aerial, buried and underground fiber.

3. The cost of the short fiber connectors that attach the interoffice ring fibers to the wire center transmission equipment via a patch panel (B-109) is $**. Appropriate in-plant factors for each state are applied to derive the installed cost.

   ** Amounts are confidential, pursuant to vendor agreements.

4. The cost of the physical fiber patch panel used to connect 24 fibers to the transmission equipment (B-110) is $**. Appropriate in-plant factors for each state are applied to derive the installed cost.

   ** Amounts are confidential, pursuant to vendor agreements.

5. As we stated above, all of the installed costs that are reflected in the recommended inputs [see Exhibit 2, lines 505 - 511] for interoffice equipment include the labor costs that are envisioned in input B-111. Therefore, this input should be set to $0, consistent with the manner in which the other recommend inputs were prepared.

6. The investment in voice-grade to DS-1 multiplexers in wire centers (B-115) required for some special access circuits is $1,652. Appropriate in-plant factors for each state are applied to derive the installed cost.

7. The investment required for a digital cross connect system that interfaces DS-1 signals between switches and OC-3 multiplexers, expressed on a DS-3 basis (B-117), is based upon the following equipment:

   - TELLABS-5500, for a cost of $3,768.
   - DACS IV, for a cost of $5,304.

   Appropriate in-plant factors for each state are applied to derive the installed cost.

8. The fraction of maximum DS-0 circuit capacity that can actually be utilized in ADMs and DS-1 to OC-3 multiplexers (B-118) is not readily available from BST actual data. The 90% default value employed by HAI R5.0a has not been supported and, in our opinion, would cause poor service levels. Some information was provided that on a total capacity available basis, the transmission terminal fill at the DS-0 level is less than 40% for BST. For purposes of this proceeding, we recommend that a fill of 80% be used.

9. The cost of interoffice aerial fiber (B-119) per foot is $0.92. Appropriate in-plant factors for each state are applied to derive the installed cost. The recommended value is the same as the recommended input value for B-57, installed cost of fiber cable, for 24-fiber cables. See Exhibit 2, lines 346 and 520.

10. The cost of placement of fiber cable structures (B-122) is derived from specific field reporting codes. See Exhibit 2, lines 28 -32 for the development of conduit placement cost. As previously discussed the placement cost of conduit is aggregated for copper and fiber and is treated accordingly throughout the model. For conduit, the costs for both material (B-124) and placement (B-122) include the cost for manholes and pullboxes. Therefore, we have set the investment in both manholes and pullboxes to zero. The costs also include the

cost of spare tubes which are, in turn, also set to zero.

See Exhibit 2, lines 40 - 51 for the development of the recommended cost of buried fiber placement.

Exhibit 13

Sensitive Input Group 11: Switching Factors

Exhibit 13

SENSITIVE INPUT GROUP 11: SWITCHING FACTORS

This Exhibit analyzes and evaluates HAI R5.0a default values, and identifies alternative values, for the following HAI R5.0a Appendix B user-adjustable inputs:

- B-77 Switch Port Administrative Fill
- B-79 MDF/Protector Investment per Line
- B-81 Switch Installation Multiplier
- B-82 Constant EO Switching Investment Term, BOC and Large ICO
- B-88 Wire Center Power Investment
- B-103 Busy Hour Fraction of Daily Usage
- B-104 Annual to Daily Usage Reduction Factor
- B-131 Operator Traffic Fraction
- B-132 Total Interoffice Traffic Fraction
- B-134 Trunk Port, per End
- B-136 Tandem-routed Fraction of Total IntraLATA Traffic
- B-137 Tandem-routed Fraction of Total InterLATA Traffic
- B-150 STP Link Capacity
- B-153 Minimum STP Investment, per Pair
- B-154 Link Termination, Both Ends
- B-157 C Link Cross Section
- B-162 Fraction of BHCA Requiring TCAP
- B-163 SCP Investment/Transaction/Second
- B-166 Operator Intervention Factor

A description of each of these UAIs can be found in the HAI Model Release 5.0a Inputs Portfolio.

This Exhibit is structured in 3 parts: Part (1) identifies the UAIs in this Sensitive Input Group for which we have obtained forward-looking cost and other forward-looking data that is specific to BellSouth, Part (2) identifies the basis upon which MCI and AT&T state they have developed their default values for the UAIs in this Sensitive Input Group and contains some of our observations about these default values, and Part (3) identifies the alternative values to replace the default values in order to reflect forward-looking costs and other conditions, based on BellSouth data.

(1)
AVAILABILITY OF COST AND OTHER FORWARD-LOOKING DATA SPECIFIC TO BELLSOUTH

Forward-looking cost (*i.e.*, no embedded cost characteristics) and other forward-looking data specific to BellSouth have been obtained for the following user-adjustable inputs:

1. Input B-77 - Switch Port Administrative Fill

    - The switch port administrative fill used for planning and engineering purposes.

2. Input B-79 - MDF/Protector Investment per Line

    - The investment for the protector and terminal.

3. Input B-81 - Switch Installation Multiplier

    - The investment in switch engineering and installation activities, expressed as a multiplier of the switch investment.

4. Input B-82 - Constant EO Switching Investment Term, BOC and Large ICO

    - The cost per line per switch used to determine the appropriate constant and office switching investment term.

5. Input B-88 - Wire Center Power Investment

    - The wire center investment required for rectifiers, battery strings, backup generators and various distribution frames, as a function of switch line size.

6 Input B-103 - Busy Hour Fraction of Daily Usage

7. Input B-104 - Annual to Daily Usage Reduction Factor

    - The assumptions, used by engineering and planning, of the effective number of business days in a year to determine the annual to daily usage reduction factor.

8. Input B-131 - Operator Traffic Fraction

    - The fraction of traffic that requires operator assistance.

9. Input B-132 - Total Interoffice Traffic Fraction

   - The fraction of all calls that are completed on a switch other than the originating switch.

10. Input B-134 - Trunk Port, per End

    - The investment in switch trunk port at each end of a trunk.

11. Input B-136 - Tandem-routed Fraction of Total IntraLATA Traffic

12. Input B-137 - Tandem-routed Fraction of Total InterLATA Traffic

13. Input B-150 - STP Link Capacity

14. Input B-153 - Minimum STP Investment, per Pair

15. Input B-154 - Link Termination, Both Ends

16. Input B-157 - C Link Cross Section

17. Input B-162 - Fraction of BHCA Requiring TCAP

18. Input B-163 - SCP Investment/Transaction/Second

19. Input B-166 - Operator Intervention Factor

(2)
MCI'S AND AT&T'S STATED BASIS FOR THEIR DEFAULT VALUES

MCI and AT&T claim the following basis for deriving the default values:

1. Switch Port Administrative Fill (B-77) is the percentage of lines in a switch that are assigned to subscribers, compared to the total equipped lines in a switch. The input portfolio states the default value to 0.98 based upon the expertise of HAI Consulting personnel. No explanation, backup or workpapers as to how this input was provided.

2. The Main Distribution Frame (MDF)/protector investment per line (B-79) is provided as $12.00. This is the MDF investment, including protector, required to terminate one line. The price was obtained by Telecom Visions, Inc., a consulting firm that assisted

in the preparation of the Inputs Portfolio. No explanation, backup or workpapers were provided as to how this default was derived.

3. The switch installation multiplier (B-81), which is the telephone company investment in switch engineering and installation activities, expressed as a multiplier of the switched investment, is 1.10. This input is based upon Bell Atlantic and SBC ONA filings made in 1992.

4. The end office switching investment constant term (B-82) is \$242.73. This input is the value of the constant appearing in the function that calculates the per line switching investment as a function of switch line size. It is emphasized that this input is *not* average switch investment cost per line. This input is based upon switching cost surveys as reported in the Northern Business Information (NBI) publication, "US, Central Office Equipment Market: 1995 data base."

5. The wire center investment required for rectifiers, battery strings, backup generators and various distributing frames, as a function of switch line size (B-88), is simply stated to be an estimate made by HAI Consulting. There is no source description, backup or workpapers for this estimate.

6. The busy hour fraction of daily use (B-103), which is the percentage of daily usage that occurs during the busy hour, is estimated to be 0.10. This is based upon an AT&T capacity cost study dated June 20, 1990.

7. The annual to daily usage reduction factor (B-104), which is the effective number of business days in a year, used to concentrate annual usage into a fewer number of days as a step in determining busy hour usage, is estimated to be 270. This estimate is based upon the AT&T capacity cost study referred to above, which uses an annual to daily usage reduction factor of 264 days.

8. The operator traffic fraction (B-131), which is the fraction of traffic, automated or manual, that requires operator assistance, is estimated to be 0.02. This is based upon the expertise of HAI Consulting personnel. There is no backup or workpapers for this estimate.

9. The total interoffice traffic fraction (B-132) is defined as the fraction of all calls that are completed on a switch other than the originating switch and is estimated to be approximately 0.65. The default value is based upon Table 4-5, p. 125, of <u>Engineering and Operations in the Bell System</u>, which shows a range from 0.34 for rural areas and 0.69 for urban areas.

10. The trunk port investment per end (B-134), which is the per trunk equivalent

investment in switch trunk port at each end of a trunk, is estimated to be $100. This is based upon the AT&T capacity cost study referred to above, and, further, HAI Consulting' assumption that $100 is for the switch port itself.

11. The tandem routed fraction of total intraLATA traffic (B-136) is estimated to be 0.2. The source of this information is data filed by the LECs in response to an FCC data request in Docket 80-286, "In the Matter of Amendment of Part 36 of the Commission's Rules and Establishment of a Joint Board, December 1, 1994."

12. The tandem routed fraction of total interLATA traffic (B-137), which is the fraction of interLATA calls that are routed through a tandem instead of directly to the IXC, is estimated to be 0.2. The source is the same data filed by the LECs in Docket 80-286, described above.

13. The STP link capacity (B-150), which is the maximum number of signaling links that can be terminated on a given STP pair, is estimated to be 720. The source of this information is the AT&T updated capacity cost study described above.

14. The STP minimum common equipment investment per pair (B-153), which is the minimum investment for a minimum capacity STP, is estimated to be $1,000,000. This is based upon the judgement of HAI Consulting personnel.

15. The cost of transmission equipment that terminates both ends of an SS7 signalling link (B-154) is estimated at $900 and based on the aforementioned AT&T study.

16. The C link cross section (B-157), which is the number of C-links in each segment connecting a mated STP pair, is estimated to be 24. This is derived assuming the 56 kbps signaling links between STPs are normally transported in a DS-1 signal, whose capacity is 24 DS-0s.

17. The fraction of busy hour call attempts (BHCA) requiring transaction capabilities application part (TCAP) (B-162), which is the percentage of BHCAs that require a database query and thus generate TCAP messages, is estimated to be 0.10. The source of this information is data from the AT&T updated capacity cost study, adjusted by HAI Consulting personnel.

18. The service control point (SCP) investment per transaction per second (B-163), which is the investment in SCP associated with database queries, or transactions, stated as the investment required per transaction per second, is estimated to be $20,000. This is based upon the 1990 data in the AT&T updated cost study referred to above, which uses a default value of $30,000. The default value used in the HAI Model represents the judgement of HAI Consulting as to the reduction of such processing costs since 1990.

19. The operator intervention factor (B-166), which is the percentage of all operator assisted calls that require operator intervention, expressed as one out of every n calls, is estimated to be 10. No source for this input was described and no backup or workpapers were provided.

(3) ALTERNATIVE VALUES BASED UPON COST AND OTHER DATA SPECIFIC TO BELLSOUTH

The following BellSouth-specific values were obtained for the user-adjustable inputs that make up Sensitive Input Group 11:

1. The default value in HAI R5.0a of 0.98 for part administrative fill (B-77) is too high and, if adopted by the telephone companies, will lead to poor service for all customers. A more normal and appropriate forward-looking switch port administrative fill of 0.94 is recommended in this proceeding.

2. The BST-specific material cost for the MDF/protector investment per line (B-79) is $15.22. When this is combined with the target output copper feeder fill factor for each state, the appropriate input varies from $22.78 to $24.67. This takes into account the MDF/protector investment per line that is required to terminate the number of equipped lines rather than the number of working lines. This adjustment is necessary, since the model implements MDF protector/investment only on working lines.

3. BST-specific data for the telephone company investment in switch engineering and installation activities indicates a switch installation multiplier (B-81) which varies from 1.0591 to 1.1502 [See Exhibit 2, line 459].

4. BellSouth-specific data for digital DMS and 5E switches provides a range of costs for switches on a forward looking basis. Using the lower end of the range of values provided (from $126 per line to over $300 per line) we conservatively reflect the impact of using the lower end of the range for each state. When this information is

fitted to the switching cost parameter curve assumed by HAI R5.0a, the constant end-office switching investment term (B-82) varies from $244.64 to $292.03 [See Exhibit 2, line 461].

5. BST-specific data for the power investment required per line (B-88) is based upon an analysis of the specific requirements for line sizes from 1,000 lines and below to 50,000 lines [See Exhibit 2, lines 468 - 472]..

6. BST-specific busy hour traffic studies indicate that the percentage of daily usage that occurs during the busy hour (B-103) varies from 0.0808 to 0.0888 [See Exhibit 2, line 499].

7. The effective number of business days in a year used to concentrate annual usage into a fewer number of days, as a step in determining busy hour usage as used for engineering and planning in BST (B-104), is 310. This is based upon the assumption that weekend and holiday traffic should be weighted as 1/2 of a business day.

8. Operator traffic data from March 1997 for BST indicates that the fraction of traffic that requires operator assistance, automated or manual (B-131), varies from 0.0030 to 0.0059 [See Exhibit 2, line 538].

9. BST data for interoffice traffic indicates that the fraction of all calls that are completed on a different switch than the originating switch (B-132) varies from 0.5415 to 0.7400 [See Exhibit 2, line 539].

10. BST-specific data for the trunk termination investment (B-134) reflects an investment per end for each trunk that varies from $58.05 to $110.77 [See Exhibit 2, line 541].

11. BST-specific traffic and separations data indicates that the tandem routed fraction of total intraLATA traffic (B-136) and interLATA traffic (B-137) varies from 0.200 to 0.554 [See Exhibit 2, lines 543 - 544]

13. The STP link capacity for a pair of STPs used by BellSouth is 1,040. This represents the maximum number of signaling links that can be terminated on a given STP pair (B-150). Given that 16 links are required as a cross connection between the mated pair, the appropriate STP link capacity for input B-150 is 1,024 (1,040 - 16).

14. The BST-specific value for the minimum STP investment, per pair (B-153), is $224,000.

15. The BST-specific investment for the transmission equipment that terminates both ends of an SS7 signalling link (B-154) is $725

16. The number of C-links in each segment connecting a mated STP pair (B-157) is 16, as indicated above.

17. The percent of busy hour call attempts that require a database query (B-162) is set in its default value in HAI R5.0a to 0.10. While this figure may be reasonable under the current environment, it is not representative in a forward-looking environment that includes competition and line number portability. With the transfer of BST customers to other competitors, the requirements for line number portability will be significant. Based upon the forward-looking nature of this assumption, there is no current data that can be provided. It is our opinion that a value substantially in excess of 0.50, which is reflected on Exhibit 2, line 571, will evolve as the appropriate forward-looking input for this factor.

18. BST-specific data indicates that the SCP investment per transaction per second (B-163) of $2,444 is appropriate. This is significantly less than the default value of $20,000.

19. BST-specific traffic data from March 1997 for the percent of all operator assisted calls that require operator intervention (B-166), expressed as one out of every n calls, indicates the values range from 2 to 3 for BellSouth [See Exhibit 2, line 575].

Exhibit 14

Sensitive Input Group 12: Expense Factors

Exhibit 14

SENSITIVE INPUT GROUP 12: EXPENSE FACTORS

This Exhibit analyzes and evaluates HAI R5.0a default values, and identifies alternative values, for the following HAI R5.0a Appendix B user-adjustable inputs:

- B-181 Income Tax Rate
- B-183 Other Taxes Factor
- B-186 Forward-Looking Network Operations Factor
- B-187 Alternative CO Switching Expense Factor
- B-188 Alternative Circuit Equipment Factor
- Other Expense Factors

A description of each of these UAIs can be found in the HAI Model Release 5.0a Inputs Portfolio.

This Exhibit is structured in 3 parts: Part (1) identifies the UAIs in this Sensitive Input Group for which we have obtained forward-looking cost and other forward-looking data that is specific to BellSouth, Part (2) identifies the basis upon which MCI and AT&T state they have developed their default values for the UAIs in this Sensitive Input Group and contains some of our observations about these default values, and Part (3) identifies the alternative values to replace the default values in order to reflect forward-looking costs and other conditions, based on BellSouth data.

(1)
AVAILABILITY OF COST AND OTHER FORWARD-LOOKING DATA SPECIFIC TO BELLSOUTH

Forward-looking cost (*i.e.*, no embedded cost characteristics) and other forward-looking data specific to BellSouth have been obtained for the following user-adjustable inputs:

1. Input B-181 - Income Tax Rate

2. Input B-183 - Other Taxes Factor

3. Input B-186 - Forward-Looking Network Operations Factor

4. Input B-187 - Alternative CO Switching Expense Factor

   - The expense to investment ratio for digital switching equipment.

5. Input B-188 - Alternative Circuit Equipment Factor

- The expense to investment ratio for all circuit equipment (as categorized in the ARMIS report).

6. Other Expense Factors

(2)
MCI'S AND AT&T'S STATED BASIS
FOR THEIR DEFAULT VALUES

MCI and AT&T claim the following basis for deriving the default values:

1. The combined Federal and State income tax rate on earnings (B-181) in HAI R5.0a is estimated based upon a nationwide average of the Federal and individual State tax rates. This nationwide average is apparently based upon an aggregate of all fifty states. While the computation of that average may include BST areas, the average is not specifically applicable to BST. No backup or data for the estimate has been provided.

2. The taxes to be paid in addition to Federal and State income taxes (B-183) is an estimate based upon the average of all Tier I LECs, expressed as a percentage of total revenue. This data is stated to be derived from ARMIS report 43-03. The estimate based upon Tier I LECs may not reflect the specific conditions of BST. The default value used in HAI R5.0a for this input is 5.0%. No backup or data for this estimate has been provided.

3. The default value for the forward-looking network operations factor (B-186) used in HAI R5.0a is 50%. This means that for the category of expenses for BST called Network Operations Expenses, which are reported in the ARMIS reports, HAI R5.0a assumes that the expense on a forward-looking basis will be one half. On a per-loop basis, this input reduces the monthly cost by $1.40 to $1.77, depending on the jurisdiction [See page 10 below].

   The HM/HAI Model Release 3.1 inputs portfolio (draft dated April 3, 1997, issued during a Workshop held in Georgia) contends that the default forward-looking network operations factor is supported by the testimony of Pacific Bell witness Mr. R. L. Scholl, dated April 17, 1996. Currently, in response to discovery, MCI and AT&T do not state that the forward-looking network operations factor is based on the testimony of Mr. R. L. Scholl or any other testimony submitted by Pacific Bell. No explanation for the apparent contradiction between the HM R4.0 inputs portfolio and the response to discovery was provided. Later drafts of the HIP remove the reference to Mr. Scholl's testimony (draft dated August 1, 1997 and later).

HAI R5.0a states that Network Operations Expenses are driven upward by antiquated systems that are more costly to maintain than the modern equipment that is assumed to be installed by the HAI Model. It further states that the HAI Model assumes that today's costs do not reflect much of the substantial savings opportunities posed by new technologies, such as new network standards, intranet and the like. Nonetheless, no specific backup or workpapers were provided to document how the proposed 50 percent reduction in Network Operations Expenses is to be accomplished.

4. The expense to investment ratio for Digital Switching Equipment (B-187), which has a default value of 0.0269 in HAI R5.0a, is based upon a value derived in a New England Incremental Cost Study for New Hampshire. This study is based upon 1993 or older New Hampshire data, and represents a system whose architecture is based upon a system that is approximately one sixth the size of BST.

   MCI and AT&T did not provide the basis upon which the default value for this input is applicable to the operations of BST and how the expense to investment ratio for digital switching for New England Telephone's New Hampshire operations compares to the expense to investment ratios for digital switching equipment for other state telephone operations and specifically for the operations of BST.

5. The expense to investment ratio for all circuit equipment (B-188), as categorized in the ARMIS reports, of 0.0153 is based upon the New England Incremental Cost Study. This is the same study as described above for input B-187, based upon 1993 or older New Hampshire data.

   MCI and AT&T did not provide the basis upon which the default value for this input is applicable to the operations of BST for any jurisdiction served by BST.

6. The operating costs or cost/investment ratios determined by HAI R5.0a, other than the expenses for digital switching equipment (B-187) and expenses related to circuit equipment (B-188), are not provided as user changeable inputs. These expenses primarily consist of expenses related to public telephone terminal equipment, poles, buildings, aerial cable, operator systems, buried cable, total cable and wire facilities and underground cable. The model recognizes that for the year 1996, the base year for which ARMIS data has been accumulated, the net expenses related to the items listed above are significant. On a forward-looking basis, HAI R5.0a estimates these same expenses to be substantially lower. This represents an average reduction 66.7% below the 1996 figures for the various states in BellSouth territory. On a per loop basis, the reduction is between $1.30 and $2.55 per month:

HAI R5.0a Reduction in Other Expenses Using
AT&T / MCI Default Inputs

		1996 ARMIS Expense ($000s)	Reduction in Other Expenses: HAI 5.0a Expense ($000s)	HAI 5.0a Percent	Reduction in Cost ($000s)	Number of Loops	Monthly Cost per Loop
1.	Alabama	$ 109,890	$ 69,237	63.01%	$ 40,653	1,968,210	$ 1.72
2.	Florida	339,125	139,300	41.08%	199,825	6,520,381	2.55
3.	Georgia	239,873	126,988	52.94%	112,885	4,343,728	2.17
4.	Kentucky	62,606	42,990	68.67%	19,616	1,255,189	1.30
5.	Louisiana	125,879	73,429	58.33%	52,450	2,305,079	1.90
6.	Mississippi	85,092	62,073	72.95%	23,019	1,264,008	1.52
7.	N. Carolina	144,784	76,754	53.01%	68,030	2,534,578	2.24
8.	S. Carolina	79,002	47,573	60.22%	31,429	1,455,585	1.80
9.	Tennessee	146,598	97,779	66.70%	48,819	2,846,289	1.43
10.	BellSouth Total	$ 1,332,849	$ 736,123	66.70%	$ 596.726	24,493,047	$ 2.03

There is virtually no support or explanation for this methodology employed by HAI R5.0a. Page 64 of the model description of HAI R5.0a states:

> estimating LEC operating costs is more difficult. Few publicly available forward-looking cost studies are available from the ILECs. Consequently, many of the operating cost estimates developed here must rely on relationships to and within historical ILEC cost information as a point of departure for estimating forward-looking costs. While certain of these costs are closely linked to the number of lines provided by the ILEC, other categories of operating expenses are related more closely to the levels of their related

investments. For this reason, the expense module develops factors for numerous expense categories and applies these factors both against investment levels and demand quantities (as appropriate) generated by previous modules.

There is no validation for the arbitrary assumption made by HAI R5.0a that it would be appropriate to use historical cost information to develop a relationship between expenses and investment, and then multiply this ratio by an estimate of forward-looking investment developed by HAI R5.0a. In fact, in response to discovery in Georgia, HAI Consulting, MCI and AT&T agree that equipment prices are not always a direct driver of indirect expenses, including maintenance and operation.

(3)
ALTERNATIVE VALUES BASED UPON COST AND OTHER DATA SPECIFIC TO BELLSOUTH

The following BellSouth-specific values were obtained for the user-adjustable inputs that make up Sensitive Input Group 12:

1. The combined Federal and State income tax rate for input B-181 is shown on Exhibit 2, line 759.

2. The tax rate paid by BST in addition to Federal and State income taxes (B-183), derived from the ARMIS report 43-03, is shown on Exhibit 17, lines 157 to 159. This data was taken for each of the BellSouth operating companies from the ARMIS data files provided in HM 5.0.

3. The support for the forward-looking network operations factor (B-186) provided by MCI/AT&T was previously cited to be the testimony of Pacific Bell witness, Mr. R.L. Scholl, dated April 17, 1996. In this testimony, Mr. Scholl makes the following observations:

   - The cost estimates produced by the model presented by MCI and AT&T known as "the HAI Proxy Model" (the HAI Model) consistently understate the costs of providing universal service in California, and the model is, therefore, not appropriate (see page 2, April 17, 1996 testimony).

   - The HAI Model's basic structure to estimate operating expenses by applying factors to incremental investments is wrong (see page 3, April 17, 1996 testimony).

- While the HAI Model's factor approach may be useful in an embedded cost study where embedded investments (the aggregate of all the investments on a company's books) are relatively stable over time, it has no place in an incremental study where equipment prices can be quite volatile (see page 4, April 17, 1996 testimony). In this BST proceeding, however, MCI and AT&T continue to advocate the factor approach to estimate operating expenses.

- The factor used in the HAI Model to estimate digital switch maintenance expenses are from the New England Telephone Cost Study for New Hampshire (see page 6, April 17, 1996 testimony). As there is no evidence that digital switch maintenance costs per line vary significantly by the line size of the switch, by using the switch maintenance factor for New Hampshire's high switch unit investment, the HAI Model creates a factor only for "small town" states like New Hampshire, but that factor is clearly much too low for California with its cities. Applying the low switch maintenance factor from New Hampshire to Pacific's lower per line switch investment will, by necessity, underestimate the switch maintenance costs of Pacific Bell.

- The HAI Model uses Pacific Bell data for development of other maintenance cost factors (see page 5, April 17, 1996 testimony). This is an example of the builders of the HAI Model selectively choosing their processes to consistently underestimate costs.

Mr. Scholl's testimony supports a cost per line per month of $26.33 (see page 11, April 17, 1996 testimony), versus the HAI Model estimate of $14.94 per line per month. Mr. Scholl's overall estimate is 76% greater than the estimate produced by the HAI Model in that proceeding. There are only two specific areas in which the estimate made by Mr. Scholl is lower than the estimate made by the HAI Model. This is in the area of uncollectibles, where the HAI Model uses a specific line item for uncollectibles, whereas the recommendations of Mr. Scholl may have this included in other accounts. The only other area where Mr. Scholl shows a lower cost per line is in network operations. No analysis of the data has been performed to determine what accounts were used by Mr. Scholl and upon what basis for this one line item were the expenses substantially below those predicted by the HAI Model. It must be remembered that in the overall context, recommendations made by Mr. Scholl are 76% above those recommended by the HAI Model including the estimate for network operations which is more than double that recommended by Mr. Scholl.

No analysis or backup has been provided to determine how the network operations expenses can be reduced by 50%. We would point out that since the early nineties, BST has implemented a considerable amount of cost savings and has reduced its workforce. Therefore the 1996 ARMIS expense data already reflects these cost savings.

Personnel expenses represent a considerable portion of the network operation expenses. It would be totally unreasonable to assume that over the period in which MCI and AT&T expect that rates would be in effect from this proceeding, that a further 50% reduction in network operations expense and the related workforce can be achieved. In the 1997 to 1999 timeframe, based on continuing productivity and workforce management, a reasonable reduction in network operations expense can be expected. We recommend that the appropriate input for B-186 in this proceeding is 90%.

4. The value recommended by HAI R5.0a for input B-187 is 0.0269, based upon data from a 1993 New Hampshire Incremental Cost Study. The infirmities with using the New Hampshire Incremental Cost Study have already been dealt with in the prior section and are summarized as follows:

- The data is from 1993 or older.

- The application of conditions in New Hampshire to the situation in the BST states is dubious at best. In New Hampshire, there were approximately 600,000 residents and business lines in the 1993 study. Of course, the number of lines served in New Hampshire has no relationship to the number of lines served by BellSouth in any of its jurisdictions.

- While MCI and AT&T have relied in the past on support from Mr. R.L. Scholl of Pacific Bell in the use of forward-looking factor, his strong criticism of the use of the New Hampshire Incremental Cost Study for this input has been ignored. Specifically, Mr. Scholl states:

  FCC ARMIS data bear out that the HAI Model's switch maintenance expense factor and reliance on New Hampshire data results in a completely unreliable estimate of switching maintenance expense. The HAI Model uses a digital switch maintenance factor of 0.0269 from a 1992 study for New Hampshire. The 1993 ARMIS data shows that the average RBOC has a digital switch maintenance factor of 0.0580, while Pacific's was 0.0540. The New Hampshire factor clearly has no relevance for Pacific Bell.

In the table attached to this section, we have presented the digital electronic switching expense factor for 160 telephone companies. The average for the entire group was 0.0570. The ratio for BST companies varies from 4.74% to 6.26% [See page 16 below]. The figure for the New Hampshire operations of the New England Telephone Company is 0.0247.

In order to be conservative we have assumed that increased efficiencies would ensue to this account in the timeframe over which rates in this proceeding would be effective. We recommend that a 10% increase in efficiency be assumed for purposes of this proceeding. Using 90% of the expense to investment ratio for BST results in a range of inputs from 4.27% to 5.64% [See Exhibit 2, line 765].

MCI and AT&T did not describe the steps taken by HAI Consulting and/or MCI and AT&T to verify that the default value for input B-187 is applicable to BST operations of BST on a forward-looking basis.

5. The value recommended by HAI R5.0a for input B-188, which is the expense to investment ratio for all circuit equipment, is also based upon the New Hampshire Incremental Cost Study. The infirmities of using the values from the New Hampshire Incremental Cost Study have already been discussed for the prior two default inputs and will not be repeated here.

   Attached in this section is a table calculating the ratio of the circuit equipment expense to its corresponding investment for all of the state by state ARMIS data as well as the Company by Company data which accompanied HAI R5.0a. The data shows an average circuit equipment expense to investment ratio of 0.0198. This ratio for BST companies range from 1.77% to 2.46% [See page 20 below]. Consistent with our recommendations in prior input variables to be conservative and to reflect productivity going forward, we recommend that 90% of the expense to investment ratio be used resulting in a range of values from 1.60% to 2.21% [See Exhibit 2, line 766].

   MCI and AT&T did not describe any step taken by HAI Consulting and/or MCI and AT&T to verify that the default value for input B-188 is applicable to the operations of BST on a forward-looking basis.

6. The expense-to-investment ratios developed by HAI R5.0a for expenses related to public telephone terminal equipment, poles, buildings, aerial cable, operator systems, buried cable, total cable and wireless facilities and underground cable, when applied to the investments determined by HAI R5.0a related to the same categories listed above, result in a forward-looking expense level related to these items which are significantly below the levels reported by ARMIS for 1996.

   MCI and AT&T did not describe the basis upon which the expense factors used in HAI R5.0a were deemed to be reasonable.

It is unreasonable to accept the result of MCI and AT&T's assumed inputs, which effectively eliminate a very significant portion of operating expenses. MCI and AT&T make this adjustment without a single item of support that such an adjustment is appropriate. This adjustment results in a decrease in the estimate of the local loop cost of between $1.30 and $2.55 per loop per month, and the model does not even permit this item to be a user changeable input! How would the staff of the Commission make an adjustment if either of them decided it was inappropriate to assume away a cost of this magnitude?

Although the expense ratios have not been presented as being a user changeable input, it is possible to go into the spreadsheet calculations and make these adjustments "offline," and we have done so. As we have recommended for inputs relating to the forward-looking network operations factor (B-186), the input for central office switching expense (B-187) and the input for the alternative circuit equipment factor (B-188), we believe that it would be reasonable to assume a productivity increase of 10% over the time period that rates from this proceeding are expected to be in effect. In addition, given that it was not our mission in this proceeding to evaluate and question the logic of HAI R5.0a, and given that the model produces a result that results in approximately 70% of the lines being served by digital loop carrier (DLC), whereas at the current time approximately 15% to 40% [See Exhibit 17, lines 160 - 162] of BST lines are served by DLC, it is reasonable to make a further adjustment to forward-looking expenses in the categories listed above. We recommend that an additional 10% adjustment be made. We recommend that for the expense items under consideration, a forward-looking factor of 0.8 be applied compared with the "hard wired" methodology employed by HAI R5.0a. Our analysis presents the effect of this adjustment.